Helical Magnetic Structure of White Light Polar Plumes

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We describe the fine structure of white light polar plumes observed by SOHO/LASCO C2coronagraph. The evolving helical structures of different scales are clearly seen on the specifically processed images (the processing reveals the faint contrast objects). The observed structures trace the magnetic field lines, sothe electric currents flow along the axis of the plumes. The MHD model of a plume takinginto account field-aligned electric currents is developed. The model permits to understand the existence of high-density plasma inside the plume due to the balance between the Ampere force and transversal pressure gradient. Consequences for the solar wind acceleration process and for the structure of heliospheric current circuit are discussed.

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